

DaimlerChrysler AG

Patent Claims

1. Method for joining a plane component to a hollow section, wherein the component and the hollow section are inserted in an internal high pressure forming tool positioned in relation to each other and are connected through the subsequent aid of a fluidic high internal pressure in the hollow section, characterized in that  
while the high internal pressure is applied, the walls (3, 5) of the hollow section (1) and the component (2), which rest against and are supposed to be connected with each other, are pressurized such by means of a die (6) that is integrated in the forming tool that the wall (3) of the hollow section (1) is punched so that the created slug (7) is attached in a positive bonding manner to one area of the hole edge (8) and increases in terms of its width towards its free end (9), and in that a section in the form of a link (10), which has the same shape as the slug (7), is bent out of the wall (5) of the component (2) into the hollow section (1) in a position that engages behind the hole edge (8) of the hollow section (1).
2. Method pursuant to claim 1, characterized in that  
the link (10) of the component (2) is precut prior to insertion into the forming tool.

3. Method pursuant to claim 1,  
characterized in that  
the contour of the link (10) of the component (2) is stamped onto the component (2) prior to insertion into the forming tool.
4. Method pursuant to claim 1,  
characterized in that  
the link (10) is cut together with the slug (7) by means of the die (6).
5. Method pursuant to one of the claims 1 through 4,  
characterized in that  
when applying pressure by means of the die (6) two links (10a, b) and two slugs (7a, b) are guided out of the walls (3, 5) of the component (2) and the hollow section (1) into their joining position, wherein the links (10a, b) and slugs (7a, b) extend into a joint hole (14) and are each diametrically opposed.
6. Method pursuant to one of the claims 1 through 5,  
characterized in that  
at least one link (10c-e) is bent out of the wall (5) of the component (2) in at least two separate areas, respectively, and that the wall (3) of the hollow section (1) is punched in accordance with the position.
7. Method pursuant to one of the claims 1 through 6,  
characterized in that  
the hollow section (1) is expanded into a box profile by means of high internal pressure from a blank with a round cross-section.
8. Device for joining a plane component to a hollow section, using an internal high pressure forming tool, in the cavity of which the hollow section and the

component are held positioned in relation to each other, comprising a fluid high pressure generator, by means of which the hollow section can be expanded using a tensile pressure fluid, comprising sealing dies to seal the ends of the hollow section,

characterized in that

the device contains at least one die (6) that is integrated in the internal high pressure forming tool and by means of which the component (2) and the hollow section (1) can be pressurized such that the wall (3) of the hollow section (1) is punched using a cutting edge (17) of the die (6) while forming an attached slug (7) and that a link (10) is bent out of the wall (5) of the component (2) into the hole (14) of the hollow section (1) while undercutting the hole edge (8).

9. Device pursuant to claim 8,

characterized in that,

on the side facing the end (12) of the link (10) that in the usage position is connected to the wall (5) of the component (2) in a positive bonding manner, the die (6) comprises a tapered lateral wall (13) with a positive incline, by means of which the link (10) can be pressed together with the slug (7) when the die (6) penetrates into the hole (14) in conjunction with the counteracting high internal pressure.

10. Device pursuant to one of the claims 8 or 9,

characterized in that

the device comprises at least two separate dies (6a-c).

11. Device pursuant to claim 8,

characterized in that

the die (6) on its face (16) comprises a displacement chamfer (19) following the cutting edge (17).

12. Device pursuant to claim 11,  
characterized in that  
on the die face (16) a displacement chamfer (19) is arranged on both sides of the  
cutting edge (17).